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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,712	09/10/2003	Takahiro Yamada	03280088AA	3169
30743	7590	03/23/2005	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			HSIEH, SHIH WEN	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/658,712

Applicant(s)

YAMADA ET AL.

Examiner

Shih-wen Hsieh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-10, 12-16 and 18 is/are rejected.
- 7) ☒ Claim(s) 7, 11, 17 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9-10-03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Objections***

2. Claim 19 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The limitation of "wherein the different level member is attached to the orifice surface" in this claim has already been recited in claim 10 to which this claim depends on and does not constitute a further limitation as required by 37 CFR 1.75(c).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-6, 8-10, 12-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (US Pat. No. 5,574,485) in view of Rezanka et al. (US Pat. No. 4,734,705).

In regard to:

Claim 1:

Anderson et al. teach:

A cleaning device (18, figs. 1-3, here called nozzle recovery device) for cleaning an orifice surface (33, figs. 2 and 3) of an inkjet head (figs. 1 and 3) and a different level member having a surface at a different level than the orifice surface, the different level member forming step between the orifice surface and the surface of the different level member, the orifice surface being formed with a row of nozzle orifices (15, fig. 3), the cleaning device comprising:

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an air flow generating unit (40, fig. 2) formed **with a suction hole (tip of passage 41, fig. 2) positioned at the nozzle orifice, the air flow generating unit generating a spiraling current** by sucking air into the suction hole, the air flow generating unit sucking from the nozzle orifice by drawing the ink in with the spiraling current, refer to col. 5, lines 44-47 and col. 6, lines 13-17.

The device of Anderson et al. DIFFERS from claim 1 in that it does not teach the underlined portion above, and to be repeated here:

a different level member having a surface at a different level than the orifice surface, the different level member forming step between the orifice surface and the surface of the different level member.

Rezanka et al. teach in their figs. 1 and 2 that an ink jet printer (10) having a nozzle plate (17), plurality of nozzles (38), and electrohydrodynamic electrodes (21, EHD electrodes), which is disposed away from the nozzle plate and having a surface at a different level than the nozzle plate, refer to col. 4, lines 45-55 and col. 7, lines 25-48.

Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the device of Anderson et al. to include this EHD electrodes as taught by Rezanka et al. for the purpose of electrohydrodynamically stimulating its ink streams.

The device of Anderson et al. as modified in view of Rezanka et al. DIFFERS from claim 1 in that it does not teach the bold-face portion above, and to be repeated here:

**with a suction hole positioned at the nozzle orifice, the air flow generating unit generating a spiraling current.**

Regarding to the first portion above, Anderson et al.'s vacuum nozzle (40) are placed at a distance away from the nozzle plate (refer to fig. 2) when performing the cleaning work. Anderson et al.'s vacuum nozzles **are not** positioned at the nozzle orifice as claim 1 recited.

Since Anderson et al.'s vacuum nozzles are used to clean the nozzles of the ink jet head. Therefore, whether the vacuum nozzles are place away from the nozzle as disclosed by Anderson et al. or positioned at the nozzle as the instant application disclosed, the cleaning of the nozzles is achieved equally by both ways. Because the nozzles of the head that need suction force to withdraw debris, ink contaminants out of those nozzles, and this suction force is furnished and applied to the nozzles by a negative generating device, such as a suction pump, through the vacuum nozzles, therefore so long as the printer has vacuum nozzles and the suction pump, the cleaning working is done in both way as discussed above.

Regarding to the second portion above, the Anderson et al.'s vacuum nozzles are mainly operated at a suction action. Air flow is generated in the vacuum nozzles by this suction action. Whether the air flow is spiraling, turbulent or homogeneous carries less patentable weight. Because no matter what type of air flow is generated, debris or ink contaminants in the nozzles of the head are going to be drawn away by the air current/flow through the vacuum nozzles anyway.

Claim 2:

The device of Anderson et al. as modified in view of Rezanka et al. DIFFERS from claim 2 in that it does not teach:

wherein the flow generating unit sucks air through the suction hole at asymmetrical flow velocity and flow rate about the row of nozzle orifices.

As discussed above for claim 1, once suction force is applied to the vacuum nozzles, the type of air flow, its velocity and flow rate are then decided by the suction device, which generates negative pressure applied to the nozzles through the vacuum nozzles. Therefore, once the suction device is selected, the vacuum nozzles are properly designed, then the type of air flow, and its velocity and flow rate can be derived. Therefore, this claim also carries less patentable weight, because everything in this claim is the result of the selection of the suction device and the design of the vacuum nozzle. Once these devices are being selected, the type of air flow, its velocity and flow rate are only the results rendered by these devices.

Claim 3:

Anderson et al. teach in the device of Anderson et al. as modified in view of Rezanka et al.:

a suction hole member (41, fig. 2) formed with the suction hole (the tip of 41);  
a negative pressure generator (vacuum source, fig. 3) that generates a negative pressure at the suction hole, refer to col. 6, lines 13-17; and  
a positioning unit (20, fig. 2) that positions the suction hole member at a suction position wherein the suction hole confronts the nozzle orifice and the different level member, also refer to col. 6, lines 13-17.

Claim 4:

The cleaning device as claimed in claim 3, wherein a gap is formed between the suction hole member and at least one the orifice surface and the different level member, the gap having a size that is asymmetric about the row nozzle orifices.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above (i.e., the gap formed). However, the size of the gap is asymmetric about the row nozzle orifices in this claim carries less patentable weight.

Because it would have been a design choice to design a size and shape of the gap based on the intended result that can be obtained from this design, and such a design would have involved a merely manipulation of the physical layout of the positions of the vacuum nozzles in respect to the nozzle plate, and such a manipulation is generally recognized as being within the level of ordinary skill in the art, refer to MPEP 2144.04 IV A& B.

Claim 5:

The cleaning device as claimed in claim 4, further comprising a stage unit that moves the suction hole member following the row of nozzle orifices formed in the orifice surface.

Rejection:

This claim is rejected on the basis as set forth for claim 3 discussed above. Because "a stage" recited in this claim has the same function as the positioning unit recited in claim 3.



Claim 6:

The cleaning device as claimed in claim 3, wherein suction hole member is formed with plurality of suction holes, the negative pressure generator generates the negative pressure at at least two adjacent ones of the plurality suction holes at a time while sequentially suctioning the plurality of suction holes.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above. Because Anderson et al. teach two suction nozzles (40).

Claim 8:

The cleaning device as claimed in claim 3 wherein the suction hole member disposed at the suction position is distanced from the orifice surface without contacting the orifice surface.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above.

Claim 9:

A cleaning device for cleaning an orifice surface of an inkjet head and a different level member attached to the orifice surface, the different level member having a surface at a different level than the orifice surface, thereby forming a step between the orifice surface and the surface of the different level member, the orifice surface being formed with a row of nozzle orifices, the cleaning device comprising:

an air flow generating unit formed with a suction hole positioned at the nozzle orifice, the air flow generating unit generating a spiraling current by sucking air into the

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suction hole, the air flow generating unit sucking ink from the nozzle orifice by drawing the ink in with spiraling current.

Rejection:

The recitation of this claim is the same as that in claim 1 and is rejected on the basis as set forth for claim 1 discussed above. This claim recites the different level member is attached to the orifice surface. Claim 1 just recites the different level member having a surface at a different level than the orifice surface. This difference is not remarkable, or claim 9 is more specific that claim 1 (i.e., claim 9 specified the different level member is attached to the nozzle surface, while claim 1 does not), and the rejection to claim 1 is therefore also applied to claim 9.

Claim 10:

An inkjet recording device comprising:

an ink jet head including:

an orifice surface formed with a row of nozzle orifices;

a different level member having a surface at a different level than the orifice surface, the different level member forming a step between the orifice surface and the surface of the different level member; and

an ink ejection unit that ejects ink droplets from each of the nozzle orifices; and the cleaning device of claim 1.

Rejection:

This claim is rejected on the basis as set forth for claim 1 discussed above.

As to the ink jet recording device in this claim, please refer to the title, or the ink jet head and its associated maintenance device constitute the ink jet recording device. In jet recording head is the numeral (10) in Anderson et al.'s fig. 1. Ink ejection unit that ejects ink droplets from each of the nozzle orifices can be either electrothermal transducer or piezo that are well known in the art.

Claim 12:

The inkjet recording device as claimed in claim 10, wherein the air flow generating unit sucks air through the suction hole at asymmetrical flow velocity and flow rate about the row of nozzle orifices.

Rejection:

This claim is rejected on the basis as set forth for claim 2 discussed above.

Claim 13:

The inkjet recording device as claimed in claim 10, wherein the air flow generating unit includes:

- a suction hole member formed with the suction hole;

- a negative pressure generator that generates a negative pressure at the suction hole; and

- a positioning unit that positions the suction hole member at a suction position wherein the suction hole confronts the nozzle orifice and the different level member.

Rejection:

This claim is rejected on the basis as set forth for claim 3 discussed above.

Claim 14:

The inkjet recording device as claimed in claim 13, wherein a gap formed between the suction hole member and at least one the orifice surface and the different level member, the gap having a size that is asymmetric about the row nozzle orifices.

Rejection:

This claim is rejected on the basis as set forth for claim 4 discussed above.

Claim 15:

The inkjet recording device as claimed in claim 14, further comprising a stage unit that moves the suction hole member following the row of nozzle orifices formed in the orifice surface.

Rejection:

This claim is rejected on the basis as set forth for claim 5 discussed above.

Claim 16:

The inkjet recording device as claimed in claim 13, wherein suction hole member is formed with plurality of suction holes, the negative pressure generator generates the negative pressure at at least two adjacent ones of the plurality suction holes at a time while sequentially suctioning the plurality of suction holes.

Rejection:

This claim is rejected on the basis as set forth for claim 6 discussed above.

Claim 18:

The inkjet recording device as claimed in claim 13, wherein the suction hole member disposed at the suction position is distanced from orifice surface without contacting the orifice surface.

Rejection:

This claim is rejected on the basis as set forth for claim 8 discussed above.

***Allowable Subject Matter***

5. Claims 7, 11 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

In regard to:

Claims 7 and 17:

The primary reason for the allowance of claims 7 and 17 is the inclusion of the limitation of wherein the suction hole member disposed at the suction position deforms while pressing against the orifice surface and the different level member without contacting the nozzle orifice. It is this limitation found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes these claims allowable over the prior art.

Claim 11:

The primary reason for the allowance of claim 11 is the inclusion of the limitation of the different level member including a charge deflection electrode formed with an ink

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reception portion. It is this limitation found in this claim, as it is claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,793,390, "Wet-wipe maintenance device for a full-width ink-jet printer" issued to Claflin et al., 8/98 teaches in their figs. 2 and 3 a vacuum nozzle (62) contacting a nozzle surface to clean the nozzles.

US 6,796,632, "Refresh ink ejection device and inkjet recording device including the refresh ink ejection device" issued to Yamada et al., 9/2004 teaches a similar arrangement as that in the instant application, except the "cleaning device".

US 6,767,087, "Inkjet head provided with deflection electrodes for deflecting ejected ink droplets" issued to Yamada et al., 7/2004 teaches a similar arrangement as that in the instant application, except the "cleaning device".

US 6,749,291, "Inkjet recording device that reuse refresh ink" issued to Satou et al., 6/2004 teaches a similar arrangement as that in the instant application, except the "cleaning device".

US 6,623,113 B2, "Inkjet recording head including electrode assembly for deflecting ink droplets" issued to Yamada et al., 9/03 teaches a similar arrangement as that in the instant application, except the "cleaning device".


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-wen Hsieh whose telephone number is 571-272-2256. The examiner can normally be reached on 7:30AM -5:00PM.

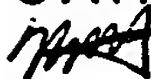
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Talbott can be reached on 571-272-1934. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

~~SHIH-WEN HSIEH~~  
~~PRIMARY EXAMINER~~

SHIH-WEN HSIEH  
PRIMARY EXAMINER

  
Shih-wen Hsieh  
Primary Examiner  
Art Unit 2861

SWH  
  
March 17, 2005